Fridley Commons Park
Well Field

FRIDLEY

WATER QUALITY SUMMARY

FOR 1990

PREPARED FOR:

CITY OF FRIDLEY

JANUARY 1991

PREPARED BY:

BRUCE A. LIESCH ASSOCIATES, INC.
HYDROGEOLOGISTS • ENGINEERS • ENVIRONMENTAL SCIENTISTS

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JANUARY, 1991

This report was prepared by me or under my direct supervision.

Michael McMurtry
Geologist

Jim de Lambert
Consulting Hydrogeologist

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1.0 INTRODUCTION

This annual summary of water quality within the City of Fridley is a result of concern regarding the occurrence of 1,1,2-Trichloroethylene (TCE) in some of the City's water supply wells. This report examines the water quality for the most recent calendar year, January through December 1990. The purpose of this report is to review water quality data to verify accuracy of the data, to identify water quality trends and to analyze TCE concentrations observed in City wells with respect to time and quantity of water pumped. The Commons Park glacial drift monitoring well program is also reviewed, and this information is incorporated into the report.

Water quality was initially examined as part of a water system study completed by Howard, Needles, Tammen and Bergendoff (HNTB) in August 1989. As part of the water system study, Bruce A. Liesch Associates, Inc. (Liesch) provided a review of the City's sources of groundwater supply. Liesch also completed a separate investigation in January 1990 entitled: "Fridley Water Quality Study". This investigation was designed to build on data collected during the HNTB study, particularly regarding the occurrence of TCE in water from the Prairie du Chien-Jordan Aquifer Wells located at the City's Commons Park Well Field (Figures 1 and 2; Sheet 1). The "Fridley Water Quality Study" documents the hydrogeologic conditions at Commons Park and summarizes groundwater monitoring and water quality trends as of January 1990. Please refer to this study for more background information.

2.0 SUMMARY OF WATER QUALITY MONITORING

Water quality monitoring for 1990 was accomplished by sampling City wells, treatment plant effluent and the Commons Park glacial drift monitoring wells. Samples were analyzed for volatile organic compounds (VOCs). This monitoring was conducted by Minnesota Valley Testing Laboratory (MVTL). In addition, the Minnesota Department of

Health (MDH) analyzed the Commons Park Treatment Plant effluent by collecting samples on a quarterly basis for 1990.

MVTL monitored the Commons Park Prairie du Chien-Jordan Wells: City Wells 6, 7, 8 and 9. A generalized geologic cross section that includes these wells is shown on Figure 1. Wells 6, 7 and 8 were sampled monthly (except for January and March 1990). Well 9 was monitored on a quarterly basis. MVTL also analyzed samples of the Commons Park Treatment Plant effluent on a monthly basis (except for January and March 1990). Other City wells were included in the monitoring program at less frequent intervals: Well 1 was sampled for VOC analyses in April and in October 1990, while Wells 10 and 11 were monitored in May, July and October 1990.

MVTL completed two sampling events for the Commons Park glacial drift monitoring wells in September and October 1990. Three monitoring wells (MW-1, MW-2 and MW-3) were installed in the glacial drift deposits at Commons Park in order to monitor shallow groundwater quality in the vicinity of the City wells impacted by TCE contamination. The location of these monitoring wells with respect to City Wells 6, 7, 8 and 9 is shown on Figure 2. This monitoring system was initially proposed in the "Water Quality Study" prepared by Liesch in January 1990. The configuration of monitoring points (MW-1, MW-2 and MW-3) was designed to identify potential contaminant migration in the drift aquifer moving in a direction consistent with regional groundwater flow. Additional background information has been documented by Liesch in the "Fridley Monitoring Well Installation Report", dated October 1990, which describes the subsurface geologic conditions encountered, well construction and development details, water level measurements and water quality data for the three monitoring wells.

3.0 GROUNDWATER QUALITY EVALUATION

3.1 Commons Park Prairie du Chien-Jordan Wells

The VOC water quality data generated from Fridley municipal wells and the glacial drift monitoring wells is summarized in Appendix A. MVTL laboratory reports were reviewed for the calendar year, January through December 1990. Appendix A represents a compilation of VOC occurrences for each sampling event; only those VOCs actually detected are recorded in Appendix A. Please refer to Appendix B for a complete listing of the VOCs tested in each sampling event. Appendix B also lists the analytical method detection limit reported by MVTL for each VOC.

The VOC water quality data generated from Fridley municipal wells prior to January 1990 was summarized previously by Liesch in the "Fridley Water Quality Study" (report and appendices dated January 1990). Table 1 provides a summary of the VOCs which have been confirmed in City wells (prior to 1990). This Table provides the number of times each VOC has been detected in the individual wells (Wells 6,7,8 and 9), as well as the highest concentration observed at each well. The applicable water quality standard for each compound is also shown on the Table. The data presented indicates that, as documented in prior reports, VOCs have impacted the Prairie du Chien-Jordan Aquifer Wells of the Commons Park Well Field (Wells 6,7, 8 and 9). Only TCE has consistently been present in the well samples. In general, the water quality from Well 9 has been impacted to the greatest degree, with TCE levels exceeding the MCL on numerous occasions (Figure 3).

Table 2 is organized according to the same format as Table 1. Table 2 provides a summary of the VOCs which have been detected in Wells 6,7,8 and 9 during the past year (1990). Once again, only TCE has consistently been present in the well samples. Well 9 is still impacted to the greatest degree. Three of four samples in 1990 exceeded the MCL

for TCE in Well 9 (Figure 4). In addition, Well 8 exceeded the MCL for TCE for the first time during the 1990 sampling period.

The detection of other VOCs in samples from Wells 6,7,8 and 9 is also shown on Table 2 for 1990. Acetone was detected in one well for one sampling event only, at 12.3 ppb. This low level occurrence is interpreted to represent laboratory interference since the laboratory quality assurance sample for the same date (sample "blank" for September 10, 1990) showed the presence of Acetone at 25.8 ppb (Appendix A). Methyl Ethyl Ketone (MEK) was detected at low levels in all four wells for one sampling event. MEK was also present in the laboratory quality assurance sample for that sampling event. This suggests that MEK detection is the result of laboratory interference and that MEK is not actually present in the well water samples.

3.2 Glacial Drift Monitoring Wells

The glacial drift monitoring wells at Commons Park were sampled by MVTL in September and October 1990 (two distinct sampling events). Acetone was found at a low level in MW-1, for one sampling event. No other potential contaminant was detected in any of the monitoring wells. Acetone was also found in a laboratory quality assurance sample suggesting that its detection in MW-1 was the result of laboratory interference. Based on these water quality results, the glacial drift deposits in the vicinity of the Commons Park Well Field do not appear to be impacted by TCE contamination.

3.3 Other Municipal Wells

Currently, the City operates two wells at Locke Park: Well 10 and Well 11. Well 10 is finished at a depth of 199 feet in glacial drift. Well 11 obtains water from a deeper aquifer, the Franconia - Ironton - Galesville Aquifer. Well 11 is finished at a depth of 669 feet in sandstone and shale, identified as the Franconia Formation on the original drilling log from 1970. Based on available information, it appears that this well may also

be open to the lower portion of the Jordan Sandstone, which overlies the St. Lawrence and Franconia Formations. The hydrogeologic characteristics of the glacial drift aquifer, the Prairie du Chien - Jordan Aquifer and the Franconia - Ironton - Galesville Aquifer were discussed previously: "Fridley Water Quality Study" (January 1990).

The water quality for Wells 10 and 11 was monitored during three sampling events for 1990, as shown in Appendix A. The results for October indicate that low levels of BETX compounds may be present in Well 11: Toluene, Xylenes and Ethyl Benzene. The concentrations detected were well below the compound RALs: 2,420 ppb for Toluene, 400 ppb for total Xylenes and 680 ppm for Ethyl Benzene. Methyl Ethyl Ketone (MEK) was also detected at a low level in Well 11 in July. MEK was present in the laboratory quality assurance sample for that sampling event. This suggests that the detection of MEK is the result of laboratory interference and that it was not actually present in the well water sample.

BETX compounds are commonly associated with gasoline and with fuel oils. For example, a leaking storage tank and/or fuel spill in the vicinity of Locke Park would be considered a potential source for these compounds. In addition, operating engines in the vicinity of sample collection can cause low level positive results in samples. The preparation of this Water Quality Summary did not include an investigation of potential sources for the compounds detected in Well 11. The presence of these compounds should be confirmed in subsequent sampling events.

3.4 Treatment Plant Effluent

Table 3 summarizes TCE levels detected in the Commons Park Treatment Plant effluent for 1990. TCE concentrations are consistently below the MCL for TCE (5 ppb). Water from the Prairie du Chien - Jordan Wells is blended with water from the Mount Simon-Hinckley Aquifer. Wells 2, 3, 4 and 5 utilize this deeper aquifer and contribute water to the blending (mainly from Wells 2, 4 and 5 during 1990).

The Commons Park Prairie du Chien - Jordan Wells were not used in January, 1990. From February through December, monthly groundwater withdrawals from these wells contributed 37% to 49% of the total Commons Park production. These wells also contributed 27% to 42% of the total production for all the municipal wells combined (on a monthly basis, February through December). The Prairie du Chien - Jordan Aquifer represents a significant source of groundwater supply for the City. The availability of water for blending from the deeper Mount Simon - Hinckley Aquifer is vital in terms of the City's ability to maintain a high quality water supply.

4.0 WATER QUALITY TRENDS

4.1 General

An analysis of water quality data over time has been completed using the TCE concentrations observed in samples from Wells 6, 7, 8 and 9. Due to the limited occurrences of the other volatile organic compounds, an analysis of their fluctuations over time is not applicable.

Figure 3 graphically illustrates the historical fluctuation of TCE observed in samples from each of the Prairie du Chien-Jordan Wells at Commons Park. TCE was first detected in Well 9 in February 1984 (as reported in the "Fridley Water Quality Study" dated January 1990). Figure 4 graphically displays in more detail TCE levels for the most recent calendar year. Well 9 is impacted to the greatest degree, historically and currently, and demonstrates the highest concentrations in TCE for each quarterly sampling event in 1990. TCE concentrations for Well 9 have fluctuated between 1984 and 1991. Significant increases are apparent in January 1989, and in July 1990. Relatively little fluctuation has occurred in the low levels of TCE detected at Well 8 until 1990. TCE levels at Well 8 have fluctuated during the past year and, as noted previously, have been observed to exceed the MCL for TCE for the first time (Figures 3 and 4). Due to the limited amount of historical data from Wells 6 and 7, definite trends cannot be established for these

wells. It is apparent, however, that peak TCE levels in these wells have occurred during 1989 and 1990.

There are no readily apparent long term water quality trends, with the exception of the persistence of Well 9 as the "leading" well in terms of the magnitude of TCE concentrations detected. In general, TCE levels have fluctuated, especially in Well 9 with peaks occurring in early 1989 and in mid-1990.

4.2 Water Quality and Groundwater Withdrawal

Monthly pumping volumes for each of the City's wells were obtained from the Fridley Public Works Department so that a comparison of TCE concentrations with pumping volumes could be made. Figures 5, 6 and 7 compare TCE concentrations with the volume of water pumped from each of Wells 6, 7, 8 and 9 (the graphs display the total withdrawal for each well for each consecutive four-month period). Note the recent decline in pumping volumes for Well 9 as shown in Figure 7. The use of Well 9 has been discontinued since 1989. Pumping volumes for Well 9 during 1990 are not significant; minor withdrawals have occurred in conjunction with water quality sampling on a quarterly basis by MVTL. Figures 8, 9, 10 and 11 compare monthly TCE concentrations for 1990 with the combined total groundwater withdrawal for Wells 6, 7, 8 and 9 (monthly totals).

Figures 12 and 13 provide a historical perspective on water quality and groundwater withdrawal for Wells 8 and 9. A comparison has been made of TCE concentrations with the combined total groundwater withdrawal volume from Wells 6, 7, 8 and 9. The volumes illustrated represent the net withdrawal for each consecutive four-month period.

Commons Park Treatment Plant operators have noted a potential correlation between groundwater pumping and TCE levels. For example, one well predominated in groundwater withdrawal for a brief period of three to four days preceding MVTL sampling

events for October, November and December, 1990 (personal communication with Jim Saefke). The lead pumping well demonstrated the highest TCE concentration for that sampling event: Well 7 for October, Well 6 for November and Well 8 for December 1990 (Appendix A). It is likely that a sampling bias exists to some extent, in that peak groundwater withdrawals may have an immediate and direct influence on the TCE levels detected in a given well. Other potential trends related to pumpage are also apparent, as discussed below.

A comparison of the TCE data from Wells 6 and 7, with their respective pumping volumes is shown in Figure 5. In each case, a time lag occurs between peak withdrawal volume and the initial peak in TCE concentration. The time lag for Well 6 appears to be approximately eight months. Well 7 has an apparent time lag of eight to 11 months as noted in the "Fridley Water Quality Study" (January 1990). This initial time lag relationship as seen for 1989 is not readily apparent in 1990, especially for Well 7. It is possible that the peak in TCE concentration at Well 6 occurring late in 1990 (November) is related to the peak pumping withdrawal for the summer months (May through August 1990). This correlation, if real, represents a three to five month time lag. This time relationship for Well 6 is shorter than the time lag seen initially in 1989. However, there is not a readily apparent mechanism that would induce the time lags observed in 1989 and 1990. These observations may represent an anomalous condition not related to pumping.

Although all of the influencing factors are not understood, the data currently available suggests that the relative groundwater withdrawal from each of the Commons Park Prairie du Chien - Jordan Wells may influence the relative concentrations of TCE to a certain extent. For example, Well 6 demonstrated the highest TCE concentration of the pumping wells for 1990 (Wells 6, 7 and 8). Well 8 exceeded the MCL for TCE for the first time ever. Both of these wells, Well 6 and Well 8, had peak monthly withdrawals exceeding 50 million gallons during 1990. This is significantly more than the pumpage from Well 7 for 1990.

The comparison of TCE concentrations versus groundwater withdrawal for Well 9 is illustrated on Figure 7. The information presented does not demonstrate a relationship for data collected prior to 1987. After 1987, two major peaks exist for both groundwater withdrawal and TCE. A possible time lag may exist. The time lag between the first peak for groundwater withdrawal and the first significant peak in TCE levels is approximately 18 months. The second major peak in TCE concentration for Well 9 occurs in mid-1990 which represents a time lag of 19 months from the secondary groundwater withdrawal peak observed for late 1988. This peak in TCE levels for mid-1990 was predicted in the January 1990 report entitled: "Fridley Water Quality Study". However, there is not a readily apparent mechanism that would induce a time lag. This observation may represent an anomalous condition not related to pumping.

A comparison has also been made of TCE concentrations in Well 9 with the total groundwater withdrawal volume from Wells 6, 7, 8 and 9. Figure 13 provides a historical perspective while Figure 11 displays data compiled for 1990 on a monthly basis. The data presented on Figure 13 indicates a possible relationship similar to that previously discussed for Well 9 but with a time lag of 18 to 23 months. However, that data presented on Figure 11 suggests that a significant time lag may not exist and that net groundwater withdrawal has a short term effect on TCE levels.

TCE continues to impact the Commons Park Prairie du Chien - Jordan Wells and has shown an increased presence in Well 8 during 1990. Well 9 persists in terms of the highest TCE levels. TCE levels in Wells 6, 7, 8 and 9 have fluctuated for at least the past two years (since 1984 in the case of Well 9). A precise correlation between TCE concentrations and groundwater withdrawals is not consistently evident for Wells 6, 7 and 8 due to the low levels of TCE detected (when compared to Well 9), due to inconsistencies associated with monitoring at pumping wells and/or due to other undetermined factors. In general, TCE levels are likely to continue fluctuating, probably in response to pumping activities and to other influences not understood at this time.

5.0 RECOMMENDATIONS

5.1 Water Supply Monitoring

Monitoring of the City's water supply wells and treatment plant effluent should continue in order to evaluate the quality of water going to distribution and to provide additional data regarding changes in concentrations with time. The monitoring of Wells 6, 7 and 8 and the treatment plant effluent should take place on a monthly basis as long as the wells are in service. Monitoring at the remaining wells and any wells taken out of service should take place on a quarterly basis. This should include additional water quality sampling at Well 11 to confirm the potential low level of BETX compounds detected in October 1990.

Water quality sampling that includes static water level measurements should be conducted for the Commons Park glacial drift monitoring wells (MW-1, MW-2 and MW-3) at approximately six-month intervals. The data generated from the monitoring wells and from the municipal wells should be reviewed as it is received and all results summarized in an annual report ("Water Quality Summary").

5.2 Potential Contaminant Source Evaluation Update

The glacial drift deposits in the vicinity of the Commons Park Well Field do not appear to be impacted by TCE contamination, based on the water quality results of two sampling events from MW-1, MW-2 and MW-3. Future work should focus on identifying a more regional contaminant source upgradient of Commons Park.

The potential contaminant source evaluation (from the 1990 "Water Quality Study") can be updated to further define possible contaminant sources from which TCE may be entering the Prairie du Chien-Jordan aquifer. This investigation would involve a review and update of MPCA file information on various sites and ground water monitoring data

generated during the remedial investigation phases of sites associated with the TCAAP facility. The MPCA will be contacted regarding disposal sites, spills or other potential contaminant sources. In addition, an attempt will be made to define potential sources for the BETX compounds detected in Well 11, in the event their presence is confirmed through subsequent water quality monitoring.

5.3 Wellhead Protection Program

Efforts can be undertaken to investigate a comprehensive wellhead protection program and to implement such a program, if feasible. Such a program might include planning, cooperation and cost sharing with neighboring communities. The purpose of such a program is to protect groundwater quality through identification of sensitive aquifer areas, to monitor surface and groundwater quality, and to protect existing and potential water supply sources. The City has already expended a considerable level of effort to monitor the TCE contamination, to investigate potential contaminant sources and to adjust operating procedures to minimize the observed TCE impacts. The existing water quality monitoring scheme and source investigations are important components of wellhead protection. Other elements of a comprehensive protection program might include an evaluation of land uses and sources for potential contaminants (other than TCE), the consideration of potential nonpoint sources of pollution, an expanded monitoring well network, computer modeling, and/or interaction with other governmental units. State agencies should be approached regarding participation in funding and assistance in designing a wellhead protection plan.

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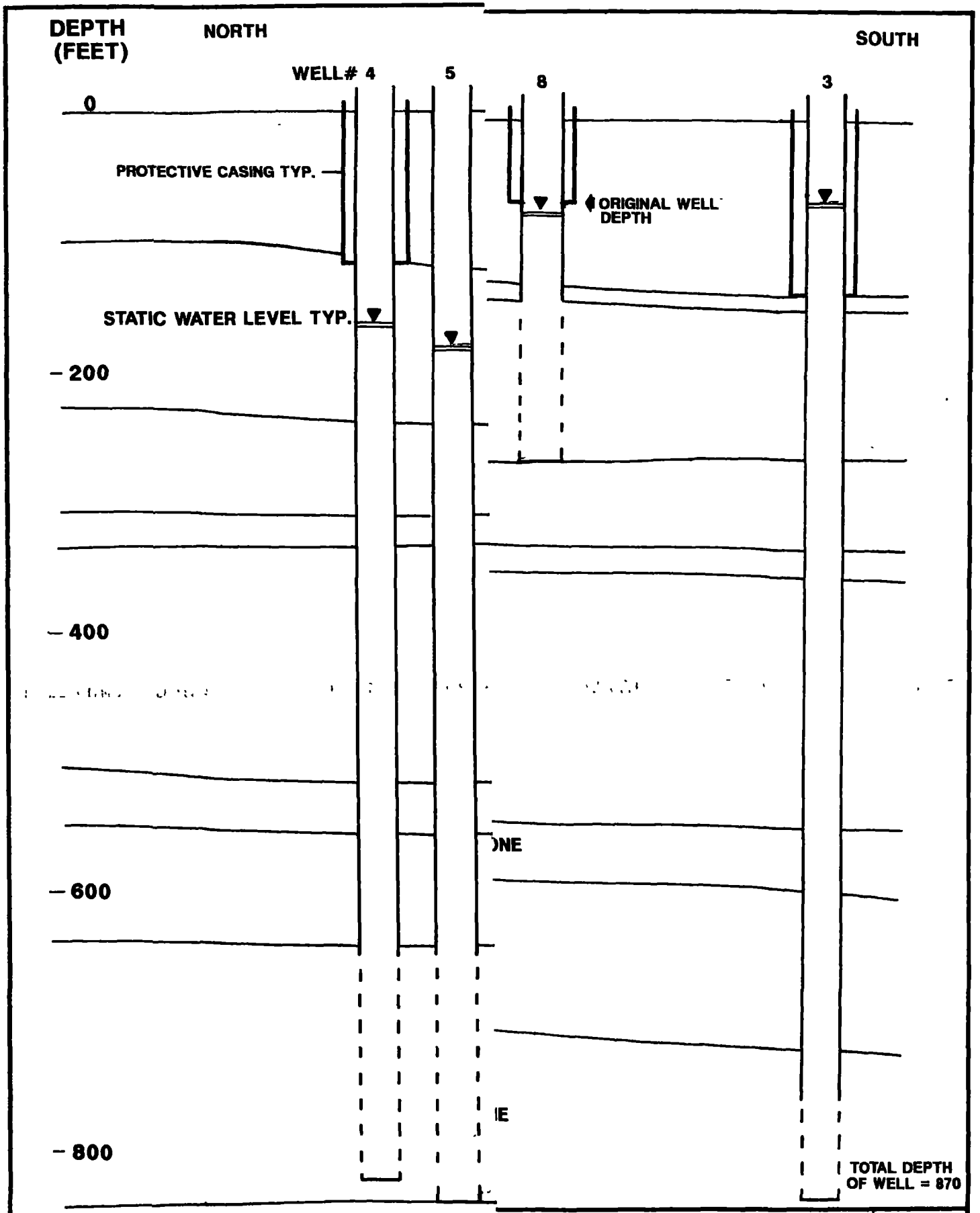
FIGURES



.EY WATER QUALITY SUMMARY | JAN 91

ERALIZED CROSS SECTION OF | FIG. 1

HORIZONTAL AND VERTICAL SCALE: 1 INCH = OMMONS PARK WELL FIELD

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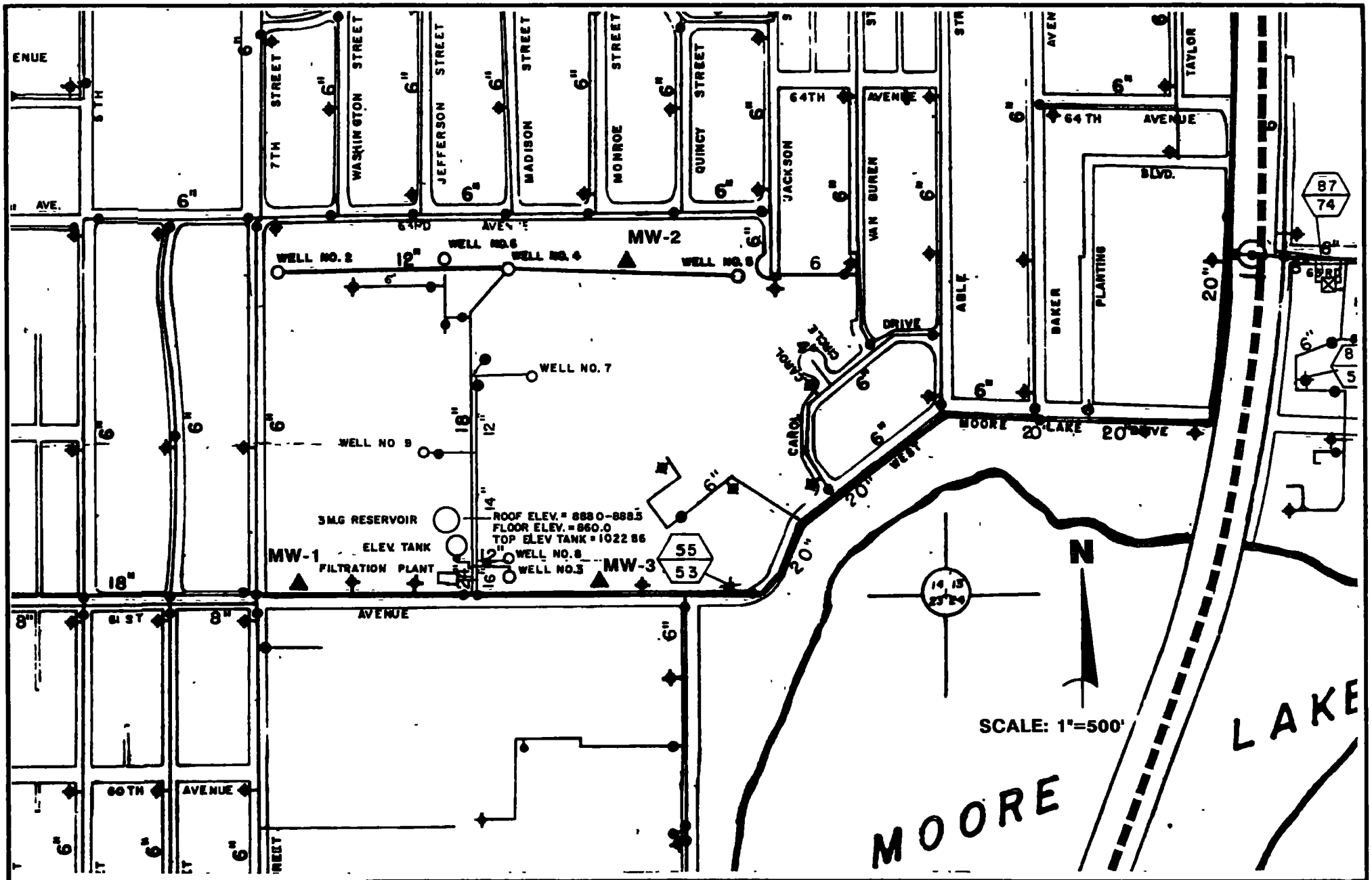

EXPLANATION

▲ MONITORING WELL LOCATION

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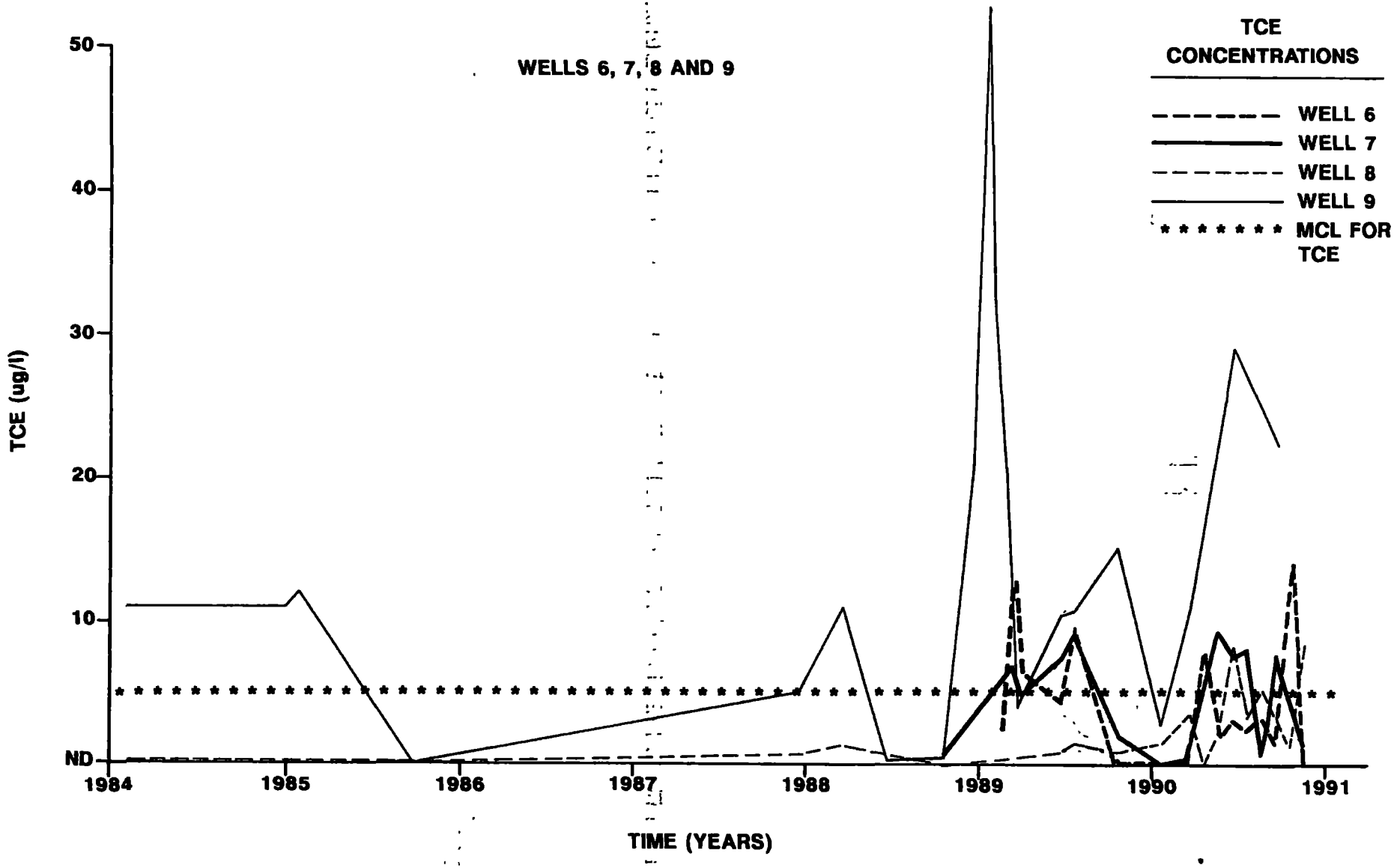
FRIDLEY WATER QUALITY SUMMARY — JAN 91

COMMONS PARK WELL FIELD MONITORING WELL LOCATION DIAGRAM — FIG. 2



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FRIDLEY WATER QUALITY SUMMARY	JAN 91
TCE CONCENTRATIONS IN WELLS 6, 7, 8 AND 9	FIG. 3

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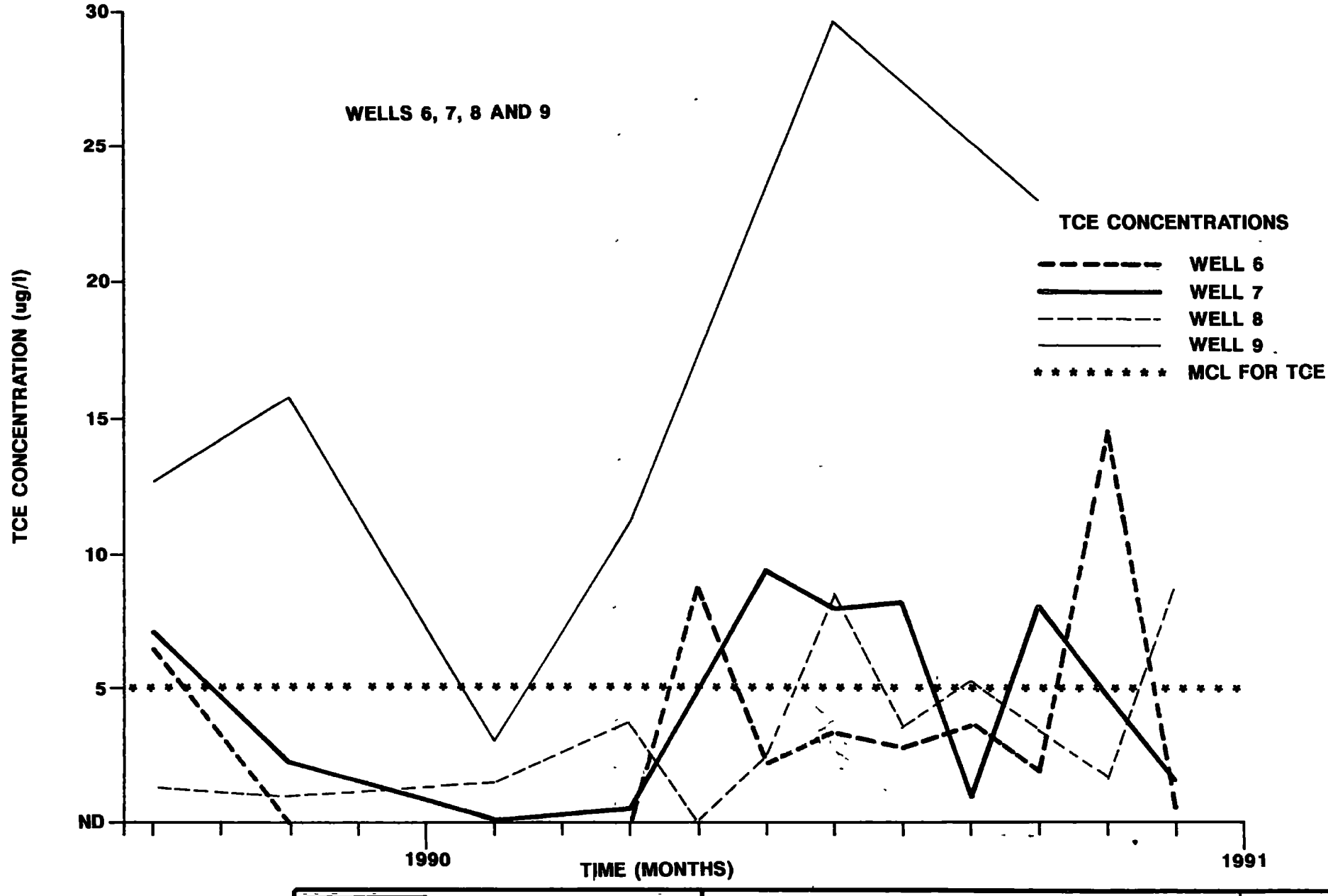

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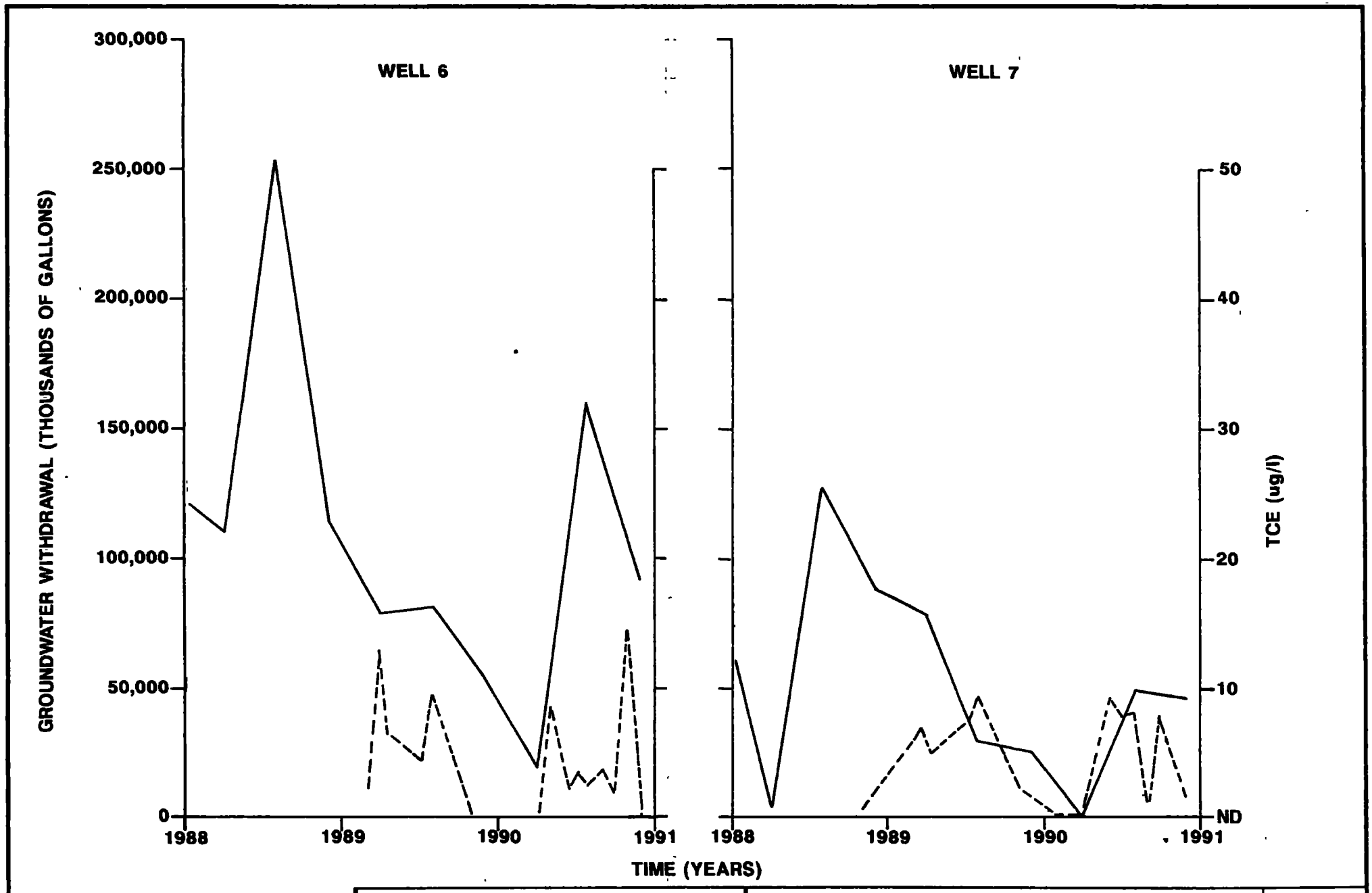
FRIDLEY WATER QUALITY SUMMARY	JAN 91
TCE CONCENTRATIONS IN WELLS 6, 7, 8 AND 9	FIG. 4



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FRIDLEY WATER QUALITY SUMMARY

JAN 91

TCE CONCENTRATIONS VS WITHDRAWAL
WELL 6 AND WELL 7

FIG. 5

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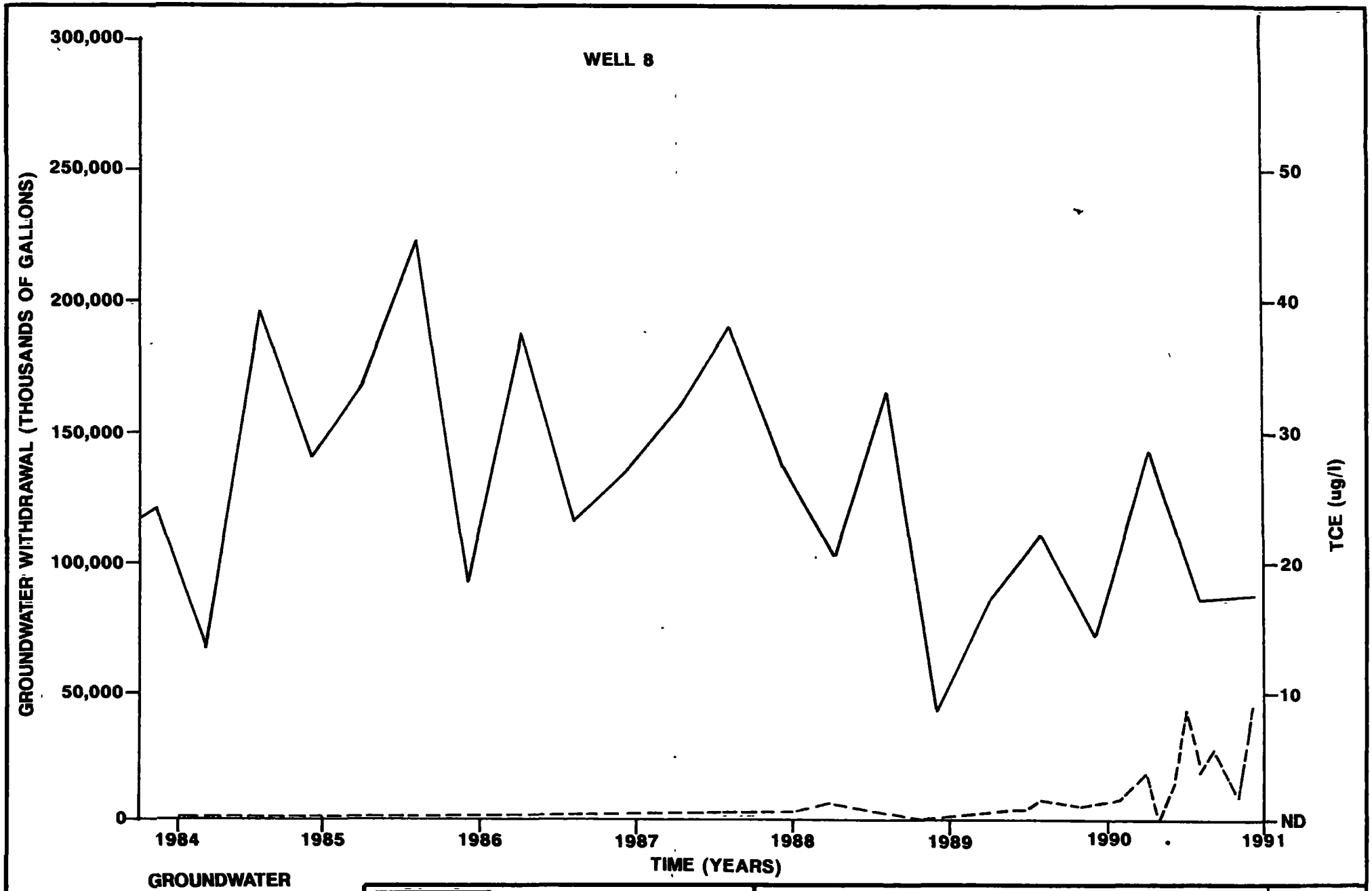

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TCE CONCENTRATION VS WITHDRAWAL
WELL 8

FIG. 6

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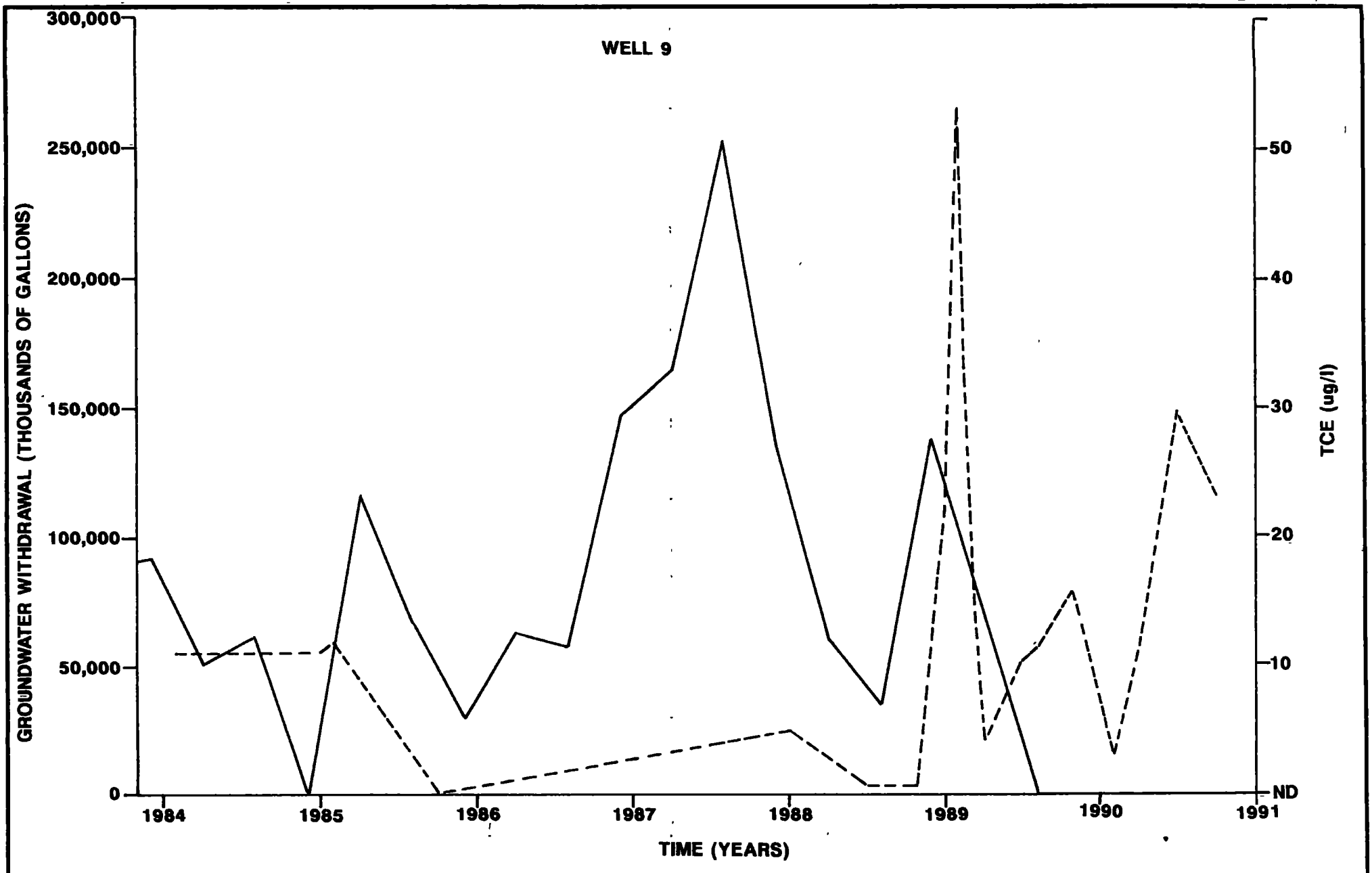

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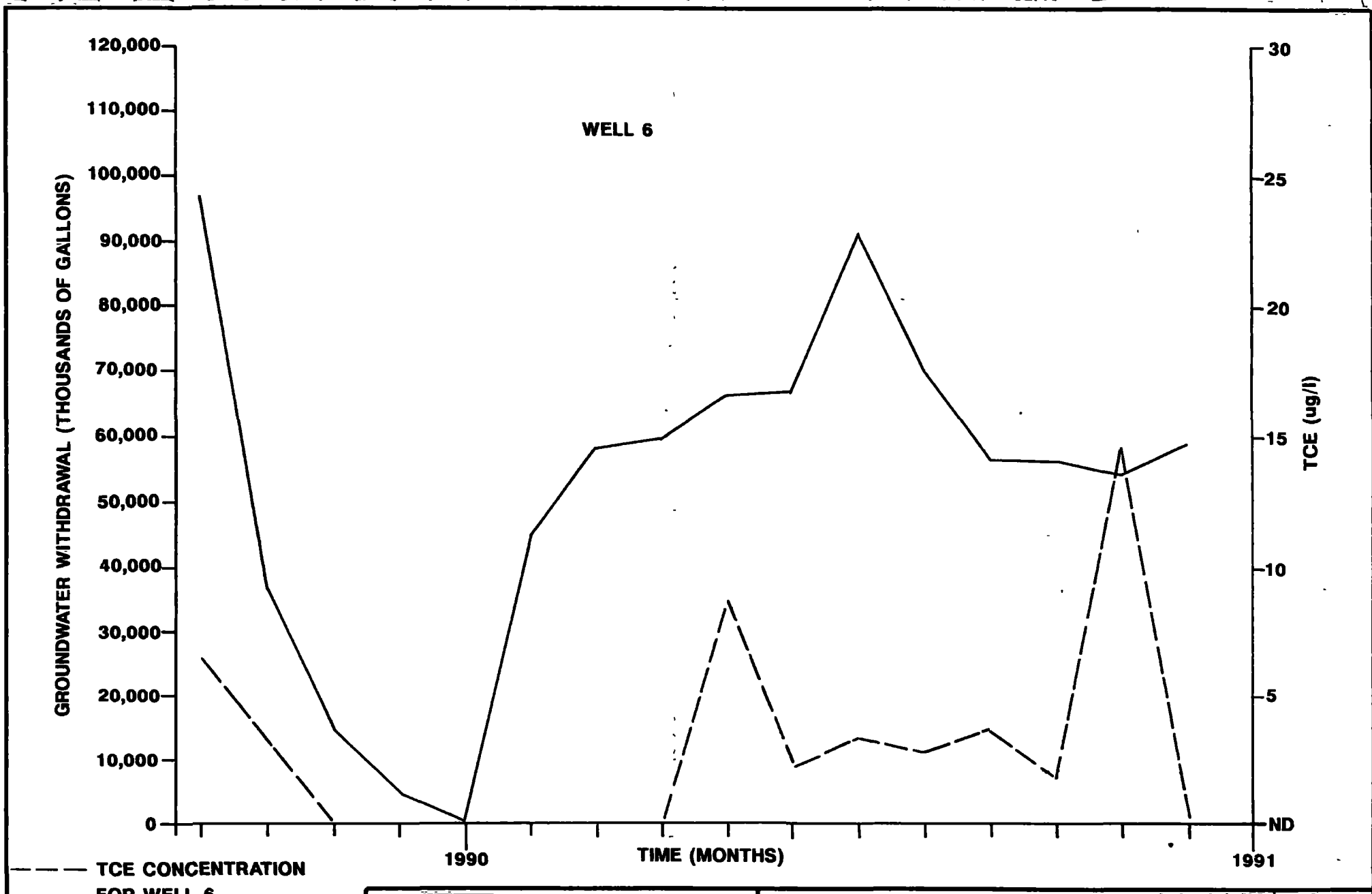
TCE CONCENTRATION VS WITHDRAWAL
WELL 9

FIG. 7



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FRIDLEY WATER QUALITY SUMMARY

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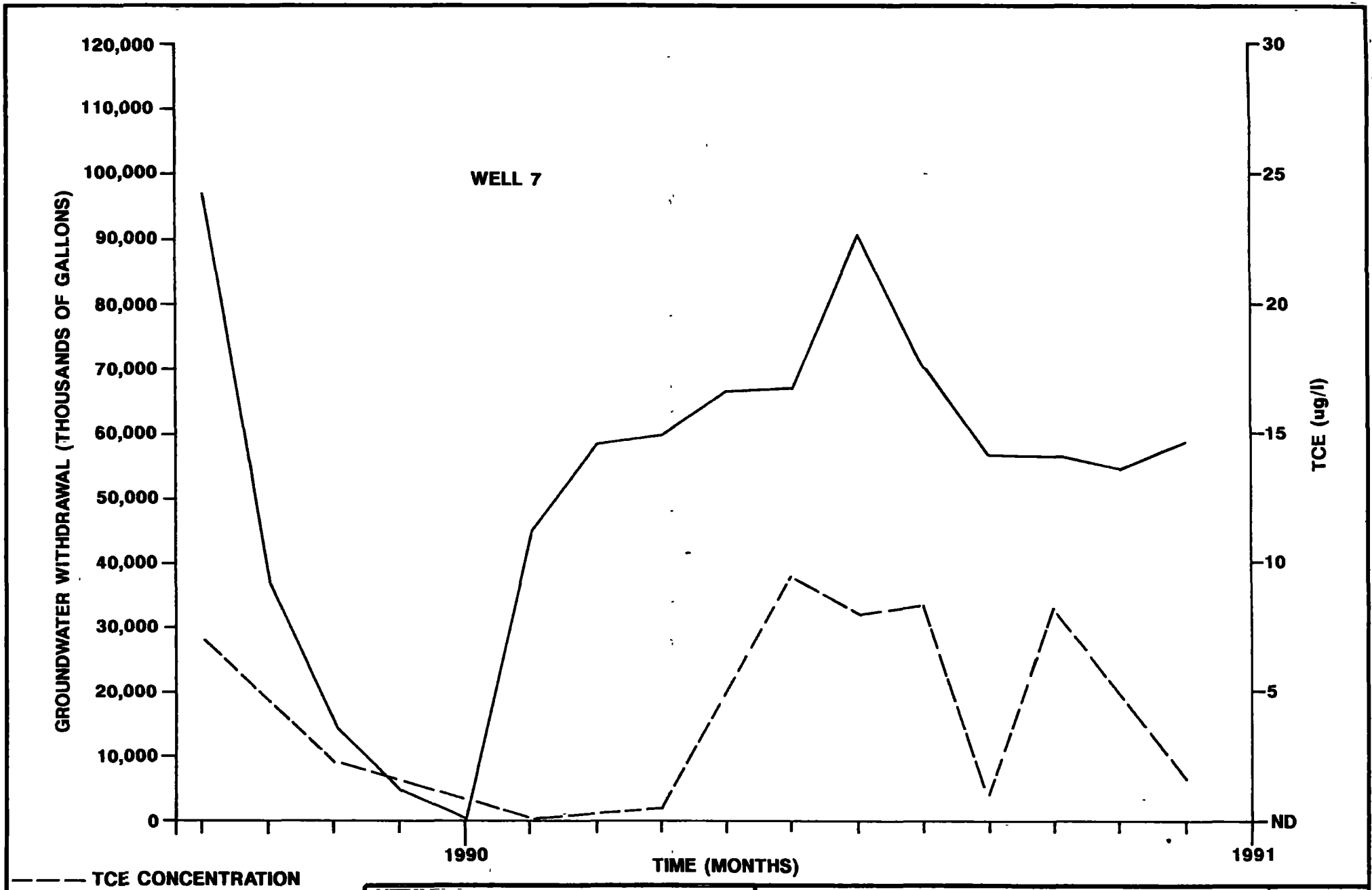
TCE CONCENTRATION VS TOTAL WITHDRAWAL
WELLS 6, 7, 8 AND 9

FIG. 8



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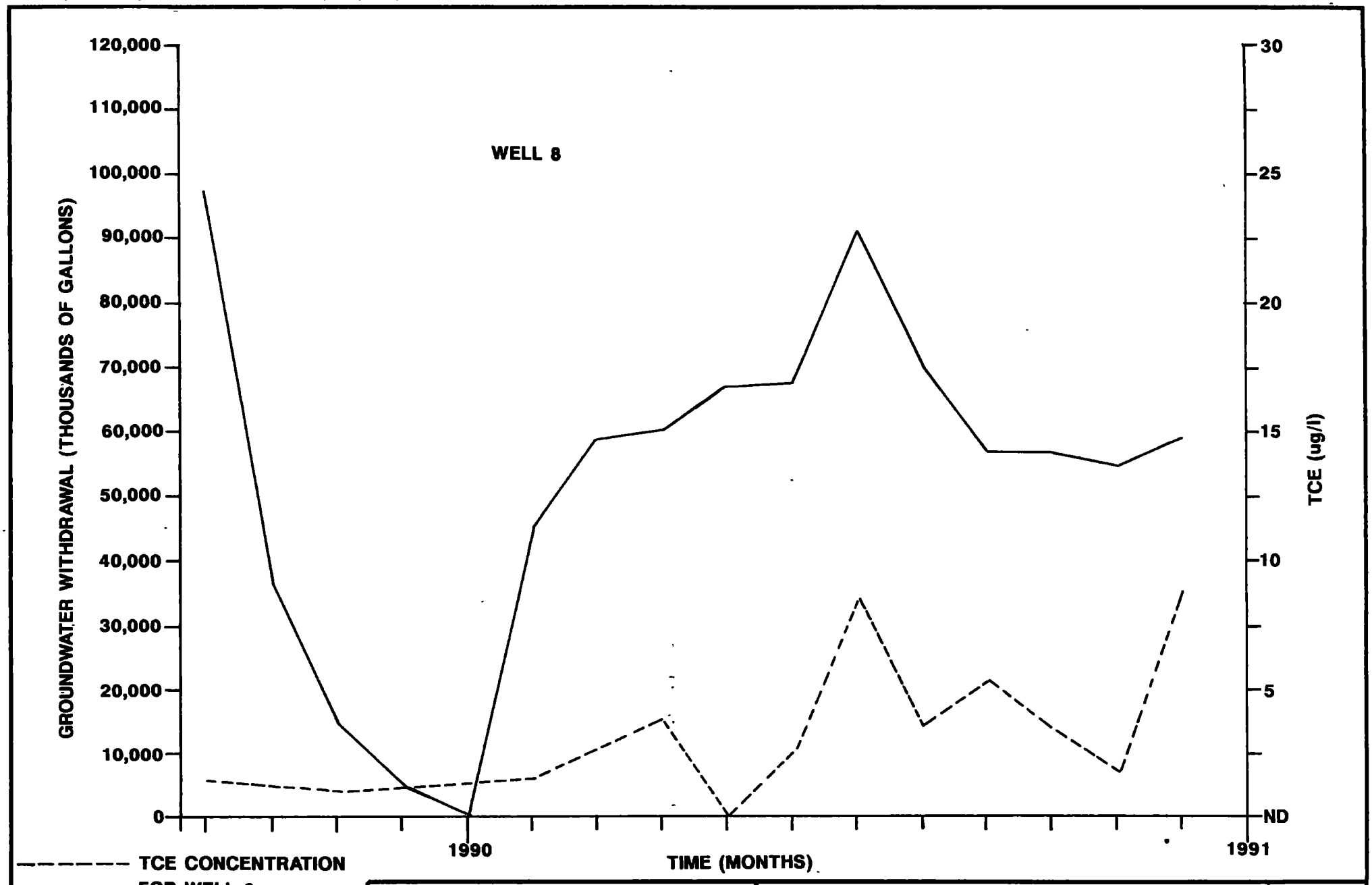
TCE CONCENTRATION VS TOTAL WITHDRAWAL WELLS 6, 7, 8 AND 9

FIG. 9



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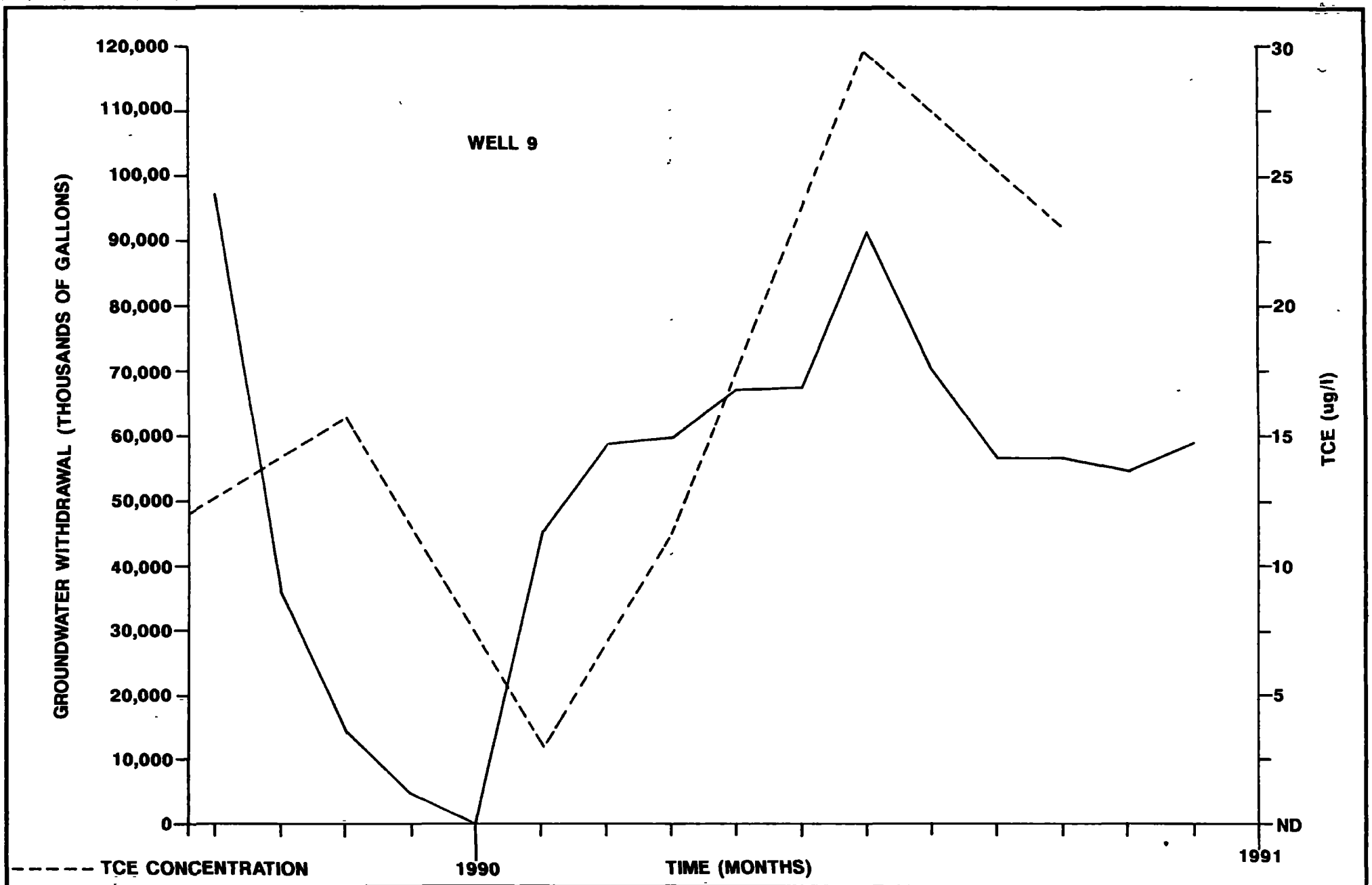
TCE CONCENTRATION VS TOTAL WITHDRAWAL
WELLS 6, 7, 8 AND 9

FIG. 10



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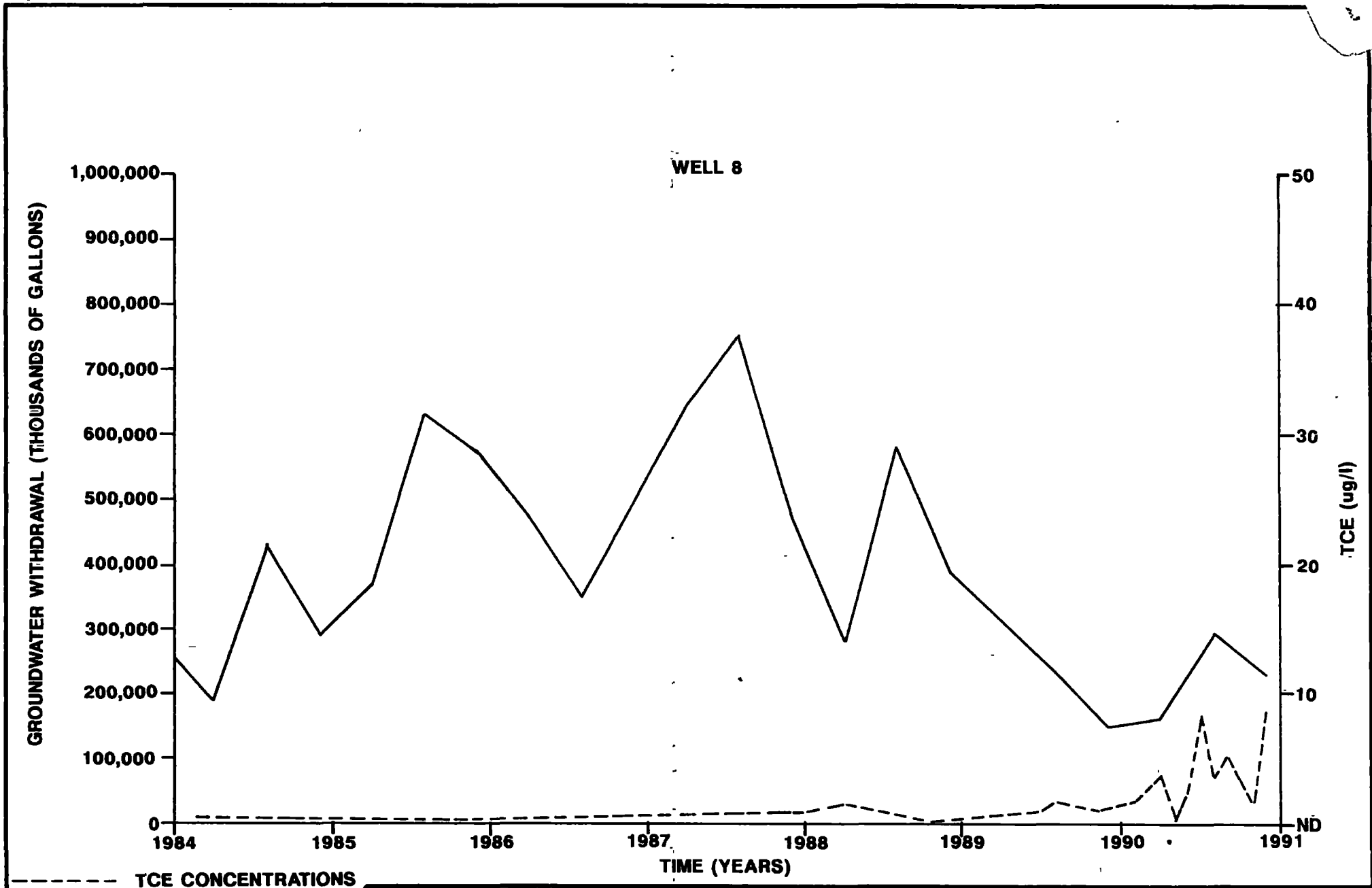
TCE CONCENTRATION VS TOTAL WITHDRAWAL
WELLS 6, 7, 8 AND 9

FIG. 11



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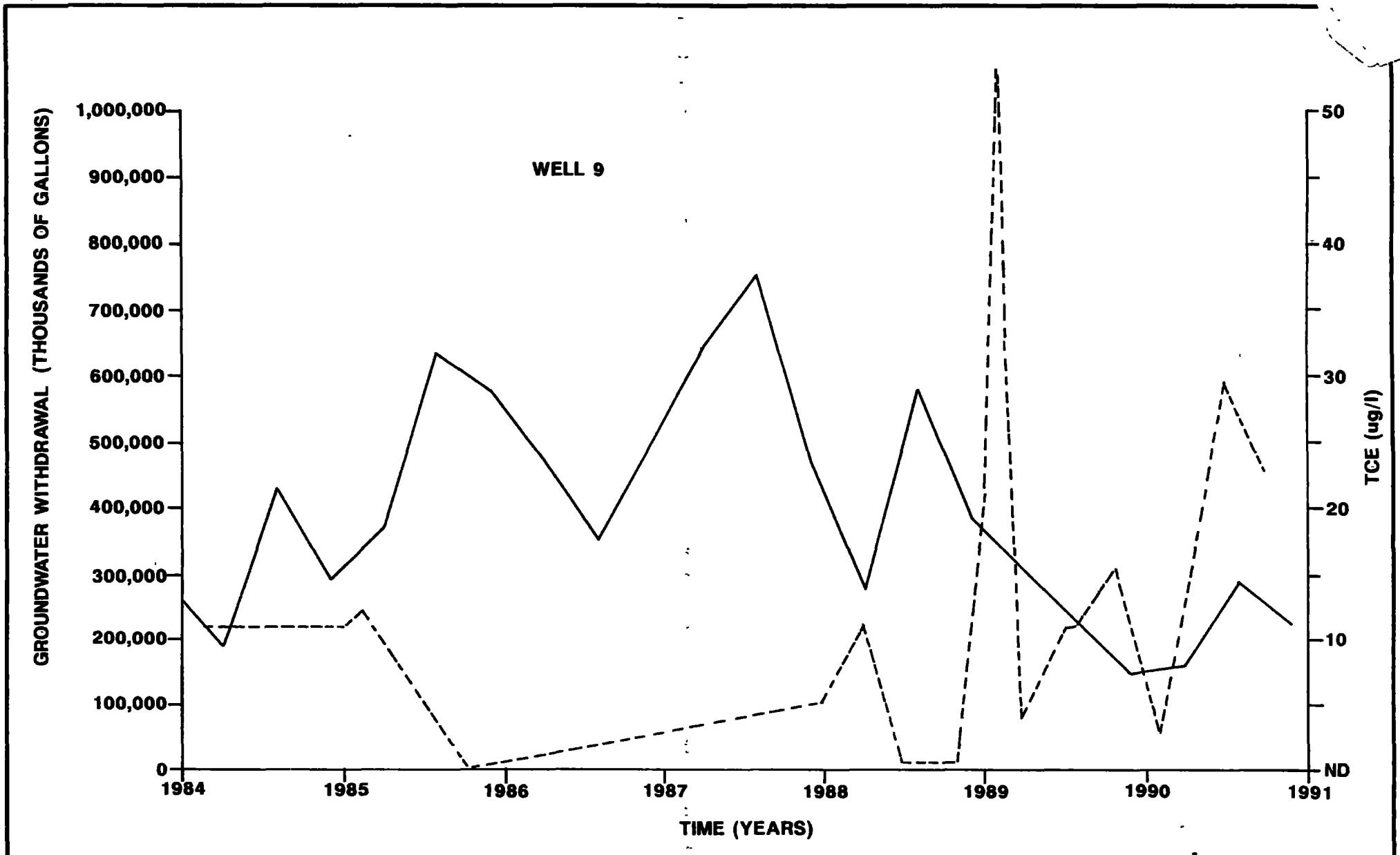
TCE CONCENTRATION VS TOTAL WITHDRAWAL WELLS 6, 7, 8 AND 9

FIG. 12



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TCE CONCENTRATION VS TOTAL WITHDRAWAL
WELLS 6, 7, 8 AND 9

FIG. 13

TABLES

TABLE 1
JANUARY, 1990
SUMMARY OF VOCS PRESENT IN
MUNICIPAL WELLS 6, 7, 8 AND 9

VOLATILE ORGANIC COMPOUND	METHOD DETECTION LIMIT	WATER QUALITY STANDARD	WELL 6 MAXIMUM CONCENTRATION (#/OCCUR.)	WELL 7 MAXIMUM CONCENTRATION (#/OCCUR.)	WELL 8 MAXIMUM CONCENTRATION (#/OCCUR.)	WELL 9 MAXIMUM CONCENTRATION (#/OCCUR.)
Trichloroethylene (TCE)	0.4	5.0 (MCL)	13 (5)	9.6 (6)	1.5 (5)	53 (15)
1,1-dichloroethane	0.2	810 (RAL)	ND (0)	ND (0)	ND (0)	0.4 (1)
1,1,2,2-tetrachloro-ethylene	0.4	6.6 (RAL)	ND (0)	ND (0)	ND (0)	1.4 (1)
cis-1,2-dichloro-ethylene	0.2	70 (RAL)	ND (0)	ND (0)	ND (0)	0.3 (2)
Methyl isobutyl ketone	1.5	350 (RAL)	ND (0)	19.1 (2)	ND (0)	ND (0)
O-Xylene	0.5	400 (RAL)	0.9 (1)	ND (0)	ND (0)	ND (0)
Methyl ethyl ketone	3.5	170 (RAL)	10.1 (1)	11.5 (1)	ND (0)	ND (0)

NOTES:

- Table 1 from Fridley Water Quality Study Report, January, 1990.
- All data is presented in ug/l (micrograms per liter) or parts per billion.
- Water Quality Standards:
  - MCL = Maximum Contaminant Limits apply to municipal water.
  - RAL = Recommended Allowable Limits apply to private water supplies and are listed where MCLs do not exist.

maw:fritbl1

1991? see fig 4

TABLE 2
JANUARY THROUGH DECEMBER, 1990
SUMMARY OF VOCS PRESENT IN
MUNICIPAL WELLS 6, 7, 8 AND 9

VOLATILE ORGANIC COMPOUND	METHOD DETECTION LIMIT	WATER QUALITY STANDARD	WELL 6 MAXIMUM CONCENTRATION (#/OCCUR.)	WELL 7 MAXIMUM CONCENTRATION (#/OCCUR.)	WELL 8 MAXIMUM CONCENTRATION (#/OCCUR.)	WELL 9 MAXIMUM CONCENTRATION (#/OCCUR.)
Trichloroethylene (TCE)	0.4	5.0 (MCL)	14.7 (8)	9.4 (8)	8.8 (9)	29.7 (4)
Methyl ethyl ketone	3.5	170 (RAL)	5.1 (1)	5.2 (1)	5.4 (1)	5.3 (1)
Acetone	10.4	700 (RAL)	12.3 (1)	ND (0)	ND (0)	ND (0)

doesn't correlate with [illegible]

NOTES:

- All data is presented in ug/l (micrograms per liter) or parts per billion.
- Water Quality Standards:
  - MCL = Maximum Contaminant Limits apply to municipal water.
  - RAL = Recommended Allowable Limits apply to private water supplies and are listed where MCLs do not exist.

maw:fritbl2

TABLE 3
JANUARY THROUGH DECEMBER, 1990
SUMMARY OF TCE PRESENT IN
COMMONS PARK TREATMENT PLANT EFFLUENT

	TCE CONCENTRATIONS	
Month	MVTL	MDH
January	No data	No data
February	0.7	0.3
March	No data	No data
April	1.3	No data
May	1.9	2.1
June	1.9	No data
July	3.6	No data
August	2.2	1.8
September	0.8	No data
October	1.9	No data
November	2.1	2.8
December	1.8	No data

Notes:

- o All data is presented in ug/l (micrograms per liter) or parts per billion.
- o Method detection limits for TCE:

  MVTL = 0.4 ppb
  MDH = 0.1 ppb

maw:fridtbl3

APPENDIX A

"CITY WELLS"

DATE SAMPLED 1990

WELL	VOC	12/10	11/8	10/12	9/10	8/9	7/10	6/8	5/10	4/10		2/9	
6	TCE	0.5	14.7	1.9	3.7	2.8	3.4	2.3	8.8	BDL		BDL	
	ACETONE				12.3								
	MEK						5.1						
7	TCE	1.6	4.8	8.1	1.0	8.3	8.0	9.4		0.5		BDL	
	MEK						5.2						
8	TCE	8.8	1.7	3.4	5.3	3.6	8.5	2.5	BDL	3.8		1.5	
	MEK						5.4						
9	TCE			23.1			29.7			11.3		3.0	
	MEK						5.3						

"CITY WELLS"

DATE SAMPLED 1990

WELL	VOC	12/10	11/8	10/12	9/10	8/9	7/10	6/8	5/10	4/10		2/9	
10	TCE (5)			BDL			BDL		BDL				
	MEK (170)						5.6						
11	TCE			BDL			BDL		BDL				
	TOLUENE (2420)			11.1									
	M-P-3 xylene			2.4									
	O- xylene			3.3									
	MEK						5.7						
	ETHYL BENZENE (680)			3.4									
1	TCE			BDL						BDL			
TRIP BLANKS	TCE & All VOCs	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL		BDL	
	EXCEPTION:												
	ACETONE	25.0			25.8								
	MEK						6.3 (7-9-90)						
	CHLOROFORM							1.0					
	TETRAHYDROFURAN											39.3	

"MONITORING WELLS"

DATE SAMPLED 1990

MW	VOC			10/12	9/10	9/14							
1	TCE ACETONE			BDL	BDL 12.4								
2	TCE			BDL		BDL							
3	TCE			BDL		BDL							
TRIP BLANKS	TCE ACETONE			BDL	BDL 25.8	BDL 14.2							

APPENDIX B

MVTL LABORATORIES, Inc.
P.O BOX 249
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

WE ARE AN EQUAL OPPORTUNITY EMPLOYER

WATER ANALYZED FOR VOLATILE ORGANIC HYDROCARBONS

Report To: City of Fridley

Submitted by: Minnesota Valley Testing Labs., Inc.
1126 N. Front Street
New Ulm, MN 56073

Kim D. Sjogren, Lab Manager

Wade E. Pullman, Chemist

Work Order #:
Date Sampled:
Date Received:
Date Reported:

Job#:

MDL = Method Detection Limits

Test methods: Purgeable Halocarbons - Method 601 and Purgeable Aromatics - Method 602. Method Detection Limits determined according to Appendix A, "Definition and Procedure for the Determination of the Method Detection Limit", EPA-600/4-82-057, July 1982.

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PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Sample Identification: _____ Job #: 0180

Date Analyzed: 12-17-90

		MDL ug/L
Purgeable Halocarbons:	Chloroethane	2.0
	Chloromethane	2.0
	Bromomethane	2.0
	Dichlorodifluoromethane	2.0
	Vinyl Chloride	0.5
	Methylene Chloride	1.4
	Trichlorofluoromethane	0.9
	1,1-Dichloroethylene	1.3
	1,1-Dichloroethane	0.2
	Trans-1,2-Dichloroethylene	0.3
	Chloroform	1.0
	1,2-Dichloroethane	0.6
	1,1,1-Trichloroethane	1.1
	Carbon Tetrachloride	0.4
	Bromodichloromethane	0.7
	1,2-Dichloropropane	0.4
	Trans-1,3-Dichloropropene	0.2
	1,1,2-Trichloroethylene	0.4
	Chlorodibromomethane	0.4
	1,1,2-Trichloroethane	0.3
	Cis-1,3-Dichloropropene	0.5
	2-Chloroethylvinyl Ether	ND
	Bromoform	0.5
	1,1,2,2-Tetrachloroethane	0.5
	1,1,2,2-Tetrachloroethylene	0.4
Purgeable Aromatics:	Chlorobenzene	0.3
	Benzene	2.0
	Toluene	2.0
	Ethyl Benzene	1.5
	1,2-Dichlorobenzene	0.6
	1,3-Dichlorobenzene	0.4
	1,4-Dichlorobenzene	0.2

MVTL LABORATORIES, Inc.
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WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Sample Identification: _____ Job #: 0180

Date Analyzed: 12-17-90

		MDL ug/L
Non-Priority Pollutants:	Cis-1,2-Dichloroethylene.....	0.8
	1,3-Dichloropropane.....	0.6
	1,2,3-Trichloropropane.....	0.7
	Allyl Chloride (3-Chloro-1-propene).....	0.5
	1,2-Dibromoethane (EDB).....	1.0
	Methyl Ethyl Ketone.....	3.5
	Methyl Isobutyl Ketone.....	1.5
	Tetrahydrofuran.....	6.0
	M-Xylene & P-Xylene.....	1.0
	O-Xylene.....	0.5
	Cumene.....	1.5
	1,1,1,2-Tetrachloroethane.....	0.5
	1,1-Dichloro-1-propene.....	1.0
	2,3-Dichloro-1-propene.....	0.8
	Dichlorofluoromethane.....	ND
	1,1,2-Trichlorotrifluoroethane.	0.9
	Ethyl Ether.....	1.6
	Acetone.....	10.4
	Dibromomethane.....	1.0

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WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Sample Identification: _____ Job #: 7266

Date Analyzed: 11-12-90

		MDL ug/L
Purgeable Halocarbons:	Chloroethane	2.0
	Chloromethane	2.0
	Bromomethane	2.0
	Dichlorodifluoromethane	2.0
	Vinyl Chloride	0.5
	Methylene Chloride	1.4
	Trichlorofluoromethane	0.9
	1,1-Dichloroethylene	1.3
	1,1-Dichloroethane	0.2
	Trans-1,2-Dichloroethylene	0.3
	Chloroform	1.0
	1,2-Dichloroethane	0.6
	1,1,1-Trichloroethane	1.1
	Carbon Tetrachloride	0.4
	Bromodichloromethane	0.7
	1,2-Dichloropropane	0.4
	Trans-1,3-Dichloropropene	0.2
	1.1,2-Trichloroethylene	0.4
	Chlorodibromomethane	0.4
	1,1,2-Trichloroethane	0.3
	Cis-1,3-Dichloropropene	0.5
	2-Chloroethylvinyl Ether	ND
	Bromoform	0.5
	1,1,2,2-Tetrachloroethane	0.5
	1,1,2,2-Tetrachloroethylene	0.4
Purgeable Aromatics:	Chlorobenzene	0.3
	Benzene	2.0
	Toluene	2.0
	Ethyl Benzene	1.5
	1,2-Dichlorobenzene	0.6
	1,3-Dichlorobenzene	0.4
	1,4-Dichlorobenzene	0.2

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WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Sample Identification: _____ Job #: 7266

Date Analyzed: 11-12-90

		MDL ug/L
Non-Priority Pollutants:	Cis-1,2-Dichloroethylene.....	0.8
	1,3-Dichloropropane.....	0.6
	1,2,3-Trichloropropane.....	0.7
	Allyl Chloride (3-Chloro-1-propene).....	0.5
	1,2-Dibromoethane (EDB).....	1.0
	Methyl Ethyl Ketone.....	3.5
	Methyl Isobutyl Ketone.....	1.5
	Tetrahydrofuran.....	6.0
	M-Xylene & P-Xylene.....	1.0
	O-Xylene.....	0.5
	Cumene.....	1.5
	1,1,1,2-Tetrachloroethane.....	0.5
	1,1-Dichloro-1-propene.....	1.0
	2,3-Dichloro-1-propene.....	0.8
	Dichlorofluoromethane.....	ND
	1,1,2-Trichlorotrifluoroethane.	0.9
	Ethyl Ether.....	1.6
	Acetone.....	10.4
	Dibromomethane.....	1.0

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Sample Identification: _____ Job #: 6219

Date Analyzed: 10-15-90

		MDL ug/L
Purgeable Halocarbons:	Chloroethane	2.0
	Chloromethane	2.0
	Bromomethane	2.0
	Dichlorodifluoromethane	2.0
	Vinyl Chloride	0.5
	Methylene Chloride	1.4
	Trichlorofluoromethane	0.9
	1,1-Dichloroethylene	1.3
	1,1-Dichloroethane	0.2
	Trans-1,2-Dichloroethylene	0.3
	Chloroform	1.0
	1,2-Dichloroethane	0.6
	1,1,1-Trichloroethane	1.1
	Carbon Tetrachloride	0.4
	Bromodichloromethane	0.7
	1,2-Dichloropropane	0.4
	Trans-1,3-Dichloropropene	0.2
	1,1,2-Trichloroethylene	0.4
	Chlorodibromomethane	0.4
	1,1,2-Trichloroethane	0.3
	Cis-1,3-Dichloropropene	0.5
	2-Chloroethylvinyl Ether	ND
	Bromoform	0.5
	1,1,2,2-Tetrachloroethane	0.5
	1,1,2,2-Tetrachloroethylene	0.4
Purgeable Aromatics:	Chlorobenzene	0.3
	Benzene	2.0
	Toluene	2.0
	Ethyl Benzene	1.5
	1,2-Dichlorobenzene	0.6
	1,3-Dichlorobenzene	0.4
	1,4-Dichlorobenzene	0.2

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WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Sample Identification: ______________________ Job #: 6219

Date Analyzed: 10-15-90

		MDL ug/L
Non-Priority Pollutants:	Cis-1,2-Dichloroethylene.......	0.8
	1,3-Dichloropropane............	0.6
	1,2,3-Trichloropropane.........	0.7
	Allyl Chloride (3-Chloro-1-propene)...........	0.5
	1,2-Dibromoethane (EDB)........	1.0
	Methyl Ethyl Ketone............	3.5
	Methyl Isobutyl Ketone.........	1.5
	Tetrahydrofuran................	6.0
	M-Xylene & P-Xylene............	1.0
	O-Xylene.......................	0.5
	Cumene.........................	1.5
	1,1,1,2-Tetrachloroethane......	0.5
	1,1-Dichloro-1-propene.........	1.0
	2,3-Dichloro-1-propene.........	0.8
	Dichlorofluoromethane..........	ND
	1,1,2-Trichlorotrifluoroethane.	0.9
	Ethyl Ether....................	1.6
	Acetone........................	10.4
	Dibromomethane.................	1.0

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Sample Identification: _____ **Job #: 5024**

Date Analyzed: 9-17-90

		MDL ug/L
Purgeable Halocarbons:	Chloroethane	2.0
	Chloromethane	2.0
	Bromomethane	2.0
	Dichlorodifluoromethane	2.0
	Vinyl Chloride	0.5
	Methylene Chloride	1.4
	Trichlorofluoromethane	0.9
	1,1-Dichloroethylene	1.3
	1,1-Dichloroethane	0.2
	Trans-1,2-Dichloroethylene	0.3
	Chloroform	1.0
	1,2-Dichloroethane	0.6
	1,1,1-Trichloroethane	1.1
	Carbon Tetrachloride	0.4
	Bromodichloromethane	0.7
	1,2-Dichloropropane	0.4
	Trans-1,3-Dichloropropene	0.2
	1,1,2-Trichloroethylene	0.4
	Chlorodibromomethane	0.4
	1,1,2-Trichloroethane	0.3
	Cis-1,3-Dichloropropene	0.5
	2-Chloroethylvinyl Ether	ND
	Bromoform	0.5
	1,1,2,2-Tetrachloroethane	0.5
	1,1,2,2-Tetrachloroethylene	0.4
Purgeable Aromatics:	Chlorobenzene	0.3
	Benzene	2.0
	Toluene	2.0
	Ethyl Benzene	1.5
	1,2-Dichlorobenzene	0.6
	1,3-Dichlorobenzene	0.4
	1,4-Dichlorobenzene	0.2

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WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Sample Identification: _____ Job #: 5024

Date Analyzed: 9-17-90

		MDL ug/L
Non-Priority Pollutants:	Cis-1,2-Dichloroethylene.....	0.8
	1,3-Dichloropropane.....	0.6
	1,2,3-Trichloropropane.....	0.7
	Allyl Chloride (3-Chloro-1-propene).....	0.5
	1,2-Dibromoethane (EDB).....	1.0
	Methyl Ethyl Ketone.....	3.5
	Methyl Isobutyl Ketone.....	1.5
	Tetrahydrofuran.....	6.0
	M-Xylene & P-Xylene.....	1.0
	O-Xylene.....	0.5
	Cumene.....	1.5
	1,1,1,2-Tetrachloroethane.....	0.5
	1,1-Dichloro-1-propene.....	1.0
	2,3-Dichloro-1-propene.....	0.8
	Dichlorofluoromethane.....	ND
	1,1,2-Trichlorotrifluoroethane.	0.9
	Ethyl Ether.....	1.6
	Acetone.....	10.4
	Dibromomethane.....	1.0

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P.O BOX 249
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Sample Identification: _____ Job #: 4309

Date Analyzed: 8-17-90

		MDL ug/L
Purgeable Halocarbons:	Chloroethane	2.0
	Chloromethane	2.0
	Bromomethane	2.0
	Dichlorodifluoromethane	2.0
	Vinyl Chloride	0.5
	Methylene Chloride	1.4
	Trichlorofluoromethane	0.9
	1,1-Dichloroethylene	1.3
	1,1-Dichloroethane	0.2
	Trans-1,2-Dichloroethylene	0.3
	Chloroform	1.0
	1,2-Dichloroethane	0.6
	1,1,1-Trichloroethane	1.1
	Carbon Tetrachloride	0.4
	Bromodichloromethane	0.7
	1,2-Dichloropropane	0.4
	Trans-1,3-Dichloropropene	0.2
	1,1,2-Trichloroethylene	0.4
	Chlorodibromomethane	0.4
	1,1,2-Trichloroethane	0.3
	Cis-1,3-Dichloropropene	0.5
	2-Chloroethylvinyl Ether	ND
	Bromoform	0.5
	1,1,2,2-Tetrachloroethane	0.5
	1,1,2,2-Tetrachloroethylene	0.4
Purgeable Aromatics:	Chlorobenzene	0.3
	Benzene	2.0
	Toluene	2.0
	Ethyl Benzene	1.5
	1,2-Dichlorobenzene	0.6
	1,3-Dichlorobenzene	0.4
	1,4-Dichlorobenzene	0.2

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Sample Identification: _____ Job #: 4309

Date Analyzed: 8-17-90

		MDL ug/L
Non-Priority Pollutants:	Cis-1,2-Dichloroethylene.....	0.8
	1,3-Dichloropropane.....	0.6
	1,2,3-Trichloropropane.....	0.7
	Allyl Chloride (3-Chloro-1-propene).....	0.5
	1,2-Dibromoethane (EDB).....	1.0
	Methyl Ethyl Ketone.....	3.5
	Methyl Isobutyl Ketone.....	1.5
	Tetrahydrofuran.....	6.0
	M-Xylene & P-Xylene.....	1.0
	O-Xylene.....	0.5
	Cumene.....	1.5
	1,1,1,2-Tetrachloroethane.....	0.5
	1,1-Dichloro-1-propene.....	1.0
	2,3-Dichloro-1-propene.....	0.8
	Dichlorofluoromethane.....	ND
	1,1,2-Trichlorotrifluoroethane.	0.9
	Ethyl Ether.....	1.6
	Acetone.....	10.4
	Dibromomethane.....	1.0

MVTL LABORATORIES, Inc.
P.O. BOX 249
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PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

Sample Identification: _____ **Job #: 3520**

Date Analyzed: 7-14-90

		MDL ug/L
Purgeable Halocarbons:	Chloroethane	2.0
	Chloromethane	2.0
	Bromomethane	2.0
	Dichlorodifluoromethane	2.0
	Vinyl Chloride	0.5
	Methylene Chloride	1.4
	Trichlorofluoromethane	0.9
	1,1-Dichloroethylene	1.3
	1,1-Dichloroethane	0.2
	Trans-1,2-Dichloroethylene	0.3
	Chloroform	1.0
	1,2-Dichloroethane	0.6
	1,1,1-Trichloroethane	1.1
	Carbon Tetrachloride	0.4
	Bromodichloromethane	0.7
	1,2-Dichloropropane	0.4
	Trans-1,3-Dichloropropene	0.2
	1,1,2-Trichloroethylene	0.4
	Chlorodibromomethane	0.4
	1,1,2-Trichloroethane	0.3
	Cis-1,3-Dichloropropene	0.5
	2-Chloroethylvinyl Ether	ND
	Bromoform	0.5
	1,1,2,2-Tetrachloroethane	0.5
	1,1,2,2-Tetrachloroethylene	0.4
Purgeable Aromatics:	Chlorobenzene	0.3
	Benzene	2.0
	Toluene	2.0
	Ethyl Benzene	1.5
	1,2-Dichlorobenzene	0.6
	1,3-Dichlorobenzene	0.4
	1,4-Dichlorobenzene	0.2

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Sample Identification: _____ **Job #: 3520**

Date Analyzed: 7-14-90

		MDL ug/L
Non-Priority Pollutants:	Cis-1,2-Dichloroethylene.....	0.8
	1,3-Dichloropropane.....	0.6
	1,2,3-Trichloropropane.....	0.7
	Allyl Chloride (3-Chloro-1-propene).....	0.5
	1,2-Dibromoethane (EDB).....	1.0
	Methyl Ethyl Ketone.....	3.5
	Methyl Isobutyl Ketone.....	1.5
	Tetrahydrofuran.....	6.0
	M-Xylene & P-Xylene.....	1.0
	O-Xylene.....	0.5
	Cumene.....	1.5
	1,1,1,2-Tetrachloroethane.....	0.5
	1,1-Dichloro-1-propene.....	1.0
	2,3-Dichloro-1-propene.....	0.8
	Dichlorofluoromethane.....	ND
	1,1,2-Trichlorotrifluoroethane.	0.9
	Ethyl Ether.....	1.6
	Acetone.....	10.4
	Dibromomethane.....	1.0

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PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

Sample Identification: _____ Job #: 2753

Date Analyzed: 6-13-90

		MDL ug/L
Purgeable Halocarbons:	Chloroethane	2.0
	Chloromethane	2.0
	Bromomethane	2.0
	Dichlorodifluoromethane	2.0
	Vinyl Chloride	2.0
	Methylene Chloride	1.4
	Trichlorofluoromethane	0.9
	1,1-Dichloroethylene	1.3
	1,1-Dichloroethane	0.2
	Trans-1,2-Dichloroethylene	0.3
	Chloroform	1.0
	1,2-Dichloroethane	0.6
	1,1,1-Trichloroethane	1.1
	Carbon Tetrachloride	0.4
	Bromodichloromethane	0.7
	1,2-Dichloropropane	0.4
	Trans-1,3-Dichloropropene	0.2
	1,1,2-Trichloroethylene	0.4
	Chlorodibromomethane	0.4
	1,1,2-Trichloroethane	0.3
	Cis-1,3-Dichloropropene	0.5
	2-Chloroethylvinyl Ether	ND
	Bromoform	0.5
	1,1,2,2-Tetrachloroethane	0.5
	1,1,2,2-Tetrachloroethylene	0.4
Purgeable Aromatics:	Chlorobenzene	0.3
	Benzene	2.0
	Toluene	2.0
	Ethyl Benzene	1.5
	1,2-Dichlorobenzene	0.6
	1,3-Dichlorobenzene	0.4
	1,4-Dichlorobenzene	0.2

MVTL LABORATORIES, Inc.
P.O BOX 249
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

Sample Identification: _____ Job #: 2753

Date Analyzed: 6-13-90

		MDL ug/L
Non-Priority Pollutants:	Cis-1,2-Dichloroethylene.....	0.8
	1,3-Dichloropropane.....	0.6
	1,2,3-Trichloropropane.....	0.7
	Allyl Chloride (3-Chloro-1-propene).....	0.5
	1,2-Dibromoethane (EDB).....	1.0
	Methyl Ethyl Ketone.....	3.5
	Methyl Isobutyl Ketone.....	1.5
	Tetrahydrofuran.....	6.0
	M-Xylene & P-Xylene.....	1.0
	O-Xylene.....	0.5
	Cumene.....	1.5
	1,1,1,2-Tetrachloroethane.....	0.5
	1,1-Dichloro-1-propene.....	1.0
	2,3-Dichloro-1-propene.....	0.8
	Dichlorofluoromethane.....	ND
	1,1,2-Trichlorotrifluoroethane.	0.9
	Ethyl Ether.....	1.6
	Acetone.....	10.4
	Dibromomethane.....	1.0

MVTL LABORATORIES, Inc.
P.O BOX 249
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

Sample Identification: _____ Job #: 2306

Date Analyzed: 5-17-90

		MDL ug/L
Purgeable Halocarbons:	Chloroethane	2.0
	Chloromethane	2.0
	Bromomethane	2.0
	Dichlorodifluoromethane	2.0
	Vinyl Chloride	2.0
	Methylene Chloride	1.4
	Trichlorofluoromethane	0.9
	1,1-Dichloroethylene	1.3
	1,1-Dichloroethane	0.2
	Trans-1,2-Dichloroethylene	0.3
	Chloroform	1.0
	1,2-Dichloroethane	0.6
	1,1,1-Trichloroethane	1.1
	Carbon Tetrachloride	0.4
	Bromodichloromethane	0.7
	1,2-Dichloropropane	0.4
	Trans-1,3-Dichloropropene	0.2
	1,1,2-Trichloroethylene	0.4
	Chlorodibromomethane	0.4
	1,1,2-Trichloroethane	0.3
	Cis-1,3-Dichloropropene	0.5
	2-Chloroethylvinyl Ether	ND
	Bromoform	0.5
	1,1,2,2-Tetrachloroethane	0.5
	1,1,2,2-Tetrachloroethylene	0.4
Purgeable Aromatics:	Chlorobenzene	0.3
	Benzene	2.0
	Toluene	2.0
	Ethyl Benzene	1.5
	1,2-Dichlorobenzene	0.6
	1,3-Dichlorobenzene	0.4
	1,4-Dichlorobenzene	0.2

MVTL LABORATORIES, Inc.
P.O BOX 249
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

Sample Identification: _____ Job #: 2306

Date Analyzed: 5-17-90

		MDL ug/L
Non-Priority Pollutants:	Cis-1,2-Dichloroethylene.....	0.8
	1,3-Dichloropropane.....	0.6
	1,2,3-Trichloropropane.....	0.7
	Allyl Chloride (3-Chloro-1-propene).....	ND
	1,2-Dibromoethane (EDB).....	1.0
	Methyl Ethyl Ketone.....	3.5
	Methyl Isobutyl Ketone.....	1.5
	Tetrahydrofuran.....	6.0
	M-Xylene & P-Xylene.....	1.0
	O-Xylene.....	0.5
	Cumene.....	1.5
	1,1,1,2-Tetrachloroethane.....	0.5
	1,1-Dichloro-1-propene.....	1.0
	2,3-Dichloro-1-propene.....	0.8
	Dichlorofluoromethane.....	ND
	1,1,2-Trichlorotrifluoroethane.	ND
	Ethyl Ether.....	1.6
	Acetone.....	10.4
	Dibromomethane.....	1.0

MVTL LABORATORIES, Inc.
P.O BOX 249
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

Sample Identification: _____ Job #: 1639

Date Analyzed: 4-16-90

		MDL ug/L
Purgeable Halocarbons:	Chloroethane	2.0
	Chloromethane	2.0
	Bromomethane	2.0
	Dichlorodifluoromethane	2.0
	Vinyl Chloride	2.0
	Methylene Chloride	1.4
	Trichlorofluoromethane	0.9
	1,1-Dichloroethylene	1.3
	1,1-Dichloroethane	0.2
	Trans-1,2-Dichloroethylene	0.3
	Chloroform	1.0
	1,2-Dichloroethane	0.6
	1,1,1-Trichloroethane	1.1
	Carbon Tetrachloride	0.4
	Bromodichloromethane	0.7
	1,2-Dichloropropane	0.4
	Trans-1,3-Dichloropropene	0.2
	1,1,2-Trichloroethylene	0.4
	Chlorodibromomethane	0.4
	1,1,2-Trichloroethane	0.3
	Cis-1,3-Dichloropropene	0.5
	2-Chloroethylvinyl Ether	ND
	Bromoform	0.5
	1,1,2,2-Tetrachloroethane	0.5
	1,1,2,2-Tetrachloroethylene	0.4
Purgeable Aromatics:	Chlorobenzene	0.3
	Benzene	2.0
	Toluene	2.0
	Ethyl Benzene	1.5
	1,2-Dichlorobenzene	0.6
	1,3-Dichlorobenzene	0.4
	1,4-Dichlorobenzene	0.2

MVTL LABORATORIES, Inc.
P.O BOX 249
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

Sample Identification: _____ Job #: 1639

Date Analyzed: 4-16-90

		MDL ug/L
Non-Priority Pollutants:	Cis-1,2-Dichloroethylene.....	0.8
	1,3-Dichloropropane.....	0.6
	1,2,3-Trichloropropane.....	0.7
	Allyl Chloride (3-Chloro-1-propene).....	ND
	1,2-Dibromoethane (EDB).....	1.0
	Methyl Ethyl Ketone.....	3.5
	Methyl Isobutyl Ketone.....	1.5
	Tetrahydrofuran.....	6.0
	M-Xylene & P-Xylene.....	1.0
	O-Xylene.....	0.5
	Cumene.....	1.5
	1,1,1,2-Tetrachloroethane.....	0.5
	1,1-Dichloro-1-propene.....	1.0
	2,3-Dichloro-1-propene.....	0.8
	Dichlorofluoromethane.....	ND
	1,1,2-Trichlorotrifluoroethane.	ND
	Ethyl Ether.....	1.6
	Acetone.....	10.4
	Dibromomethane.....	1.0

LABORATORIES, Inc.
PO BOX 249
[illegible]
764-2930

Sample Identification: _____ Job #: 732

Date Analyzed: 2-15-90

		MDL ug/L
Purgeable Halocarbons:	Chloroethane	ND
	Chloromethane	ND
	Bromomethane	ND
	Dichlorodifluoromethane	ND
	Vinyl Chloride	ND
	Methylene Chloride	1.4
	Trichlorofluoromethane	0.9
	1,1-Dichloroethylene	1.3
	1,1-Dichloroethane	0.2
	Trans-1,2-Dichloroethylene	0.3
	Chloroform	1.0
	1,2-Dichloroethane	0.6
	1,1,1-Trichloroethane	1.1
	Carbon Tetrachloride	0.4
	Bromodichloromethane	0.7
	1,2-Dichloropropane	0.4
	Trans-1,3-Dichloropropene	0.2
	1,1,2-Trichloroethylene	0.4
	Chlorodibromomethane	0.4
	1,1,2-Trichloroethane	0.3
	Cis-1,3-Dichloropropene	0.5
	2-Chloroethylvinyl Ether	ND
	Bromoform	0.5
	1,1,2,2-Tetrachloroethane	0.5
	1,1,2,2-Tetrachloroethylene	0.4
Purgeable Aromatics:	Chlorobenzene	0.3
	Benzene	2.0
	Toluene	2.0
	Ethyl Benzene	1.5
	1,2-Dichlorobenzene	0.6
	1,3-Dichlorobenzene	0.4
	1,4-Dichlorobenzene	0.2

LABORATORIES, Inc.
PO Box 249

Sample Identification: _____ Job #: 732

Date Analyzed: 2-15-90

Non-Priority Pollutants:		MDL ug/L
	Cis-1,2-Dichloroethylene.....	0.8
	1,3-Dichloropropane.....	0.6
	1,2,3-Trichloropropane.....	0.7
	Allyl Chloride (3-Chloro-1-propene).....	ND
	1,2-Dibromoethane (EDB).....	1.0
	Methyl Ethyl Ketone.....	3.5
	Methyl Isobutyl Ketone.....	1.5
	Tetrahydrofuran.....	6.0
	M-Xylene & P-Xylene.....	1.0
	O-Xylene.....	0.5
	Cumene.....	1.5
	1,1,1,2-Tetrachloroethane.....	0.5
	1,1-Dichloro-1-propene.....	1.0
	2,3-Dichloro-1-propene.....	0.8
	Dichlorofluoromethane.....	ND
	1,1,2-Trichlorotrifluoroethane.	ND
	Ethyl Ether.....	1.6
	Acetone.....	10.4
	Dibromomethane.....	1.0